

STINK BUG HAS A INITIAL  
velocity of  $1 \text{ m/s}$  Right  
MR. AFE HITS THE STINK BUG  
WITH A FLY SWATTER &  
the Stink Bug has A FINAL  
Velocity of  $2 \text{ m/s}$  Left.  
WHAT is the change in  
Velocity?

$$N_i = 1 \text{ m/s Right } \oplus \rightarrow$$
$$N_f = 2 \text{ m/s Left}$$
$$-2 \text{ m/s}$$

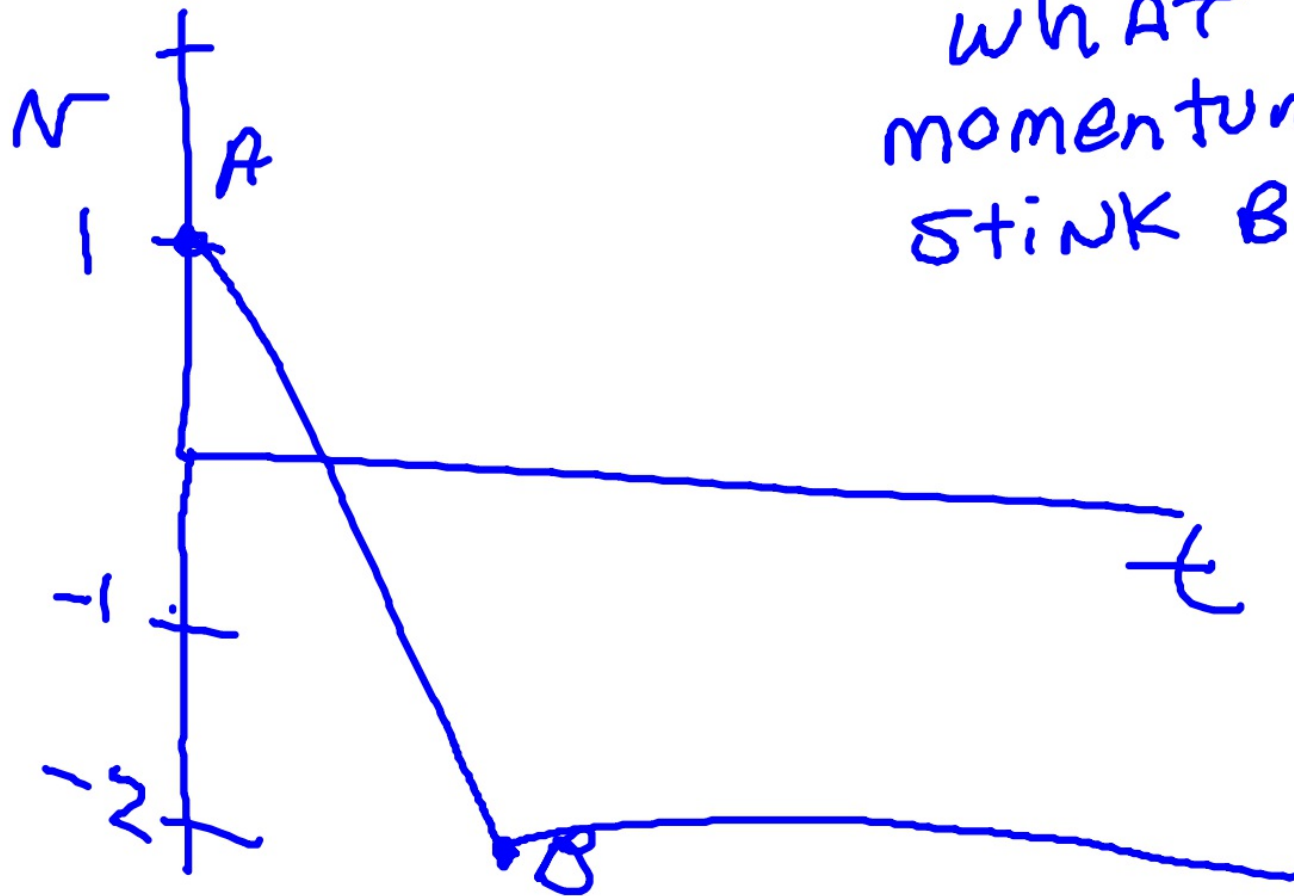
$$\Delta N = N_f - N_i$$
$$= -2 \text{ m/s} - 1 \text{ m/s}$$

$$\Delta N = -3 \text{ m/s Left}$$
$$3 \text{ m/s Left}$$

Stink Bug has A mass of  
.02 kg

$\sqrt{t}$

What is the  
momentum of  
Stink Bug @ A



$$m = .02 \text{ kg}$$

$$v_A = 1 \text{ m/s}$$

$$p_A = ?$$

$$p = m v = (.02 \text{ kg})(1 \text{ m/s})$$

$$.02 \text{ kg m/s Right}$$

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$$m = .02 \text{ kg}$$

$$v_B = -2 \text{ m/s}$$

$$p_B = ?$$

$$p = m v$$

$$= (.02)(-2 \text{ m/s})$$

$$= -.04 \text{ kg m/s Left}$$

Impulse on Stink Bug?

$$m = .02 \text{ kg}$$

$$\Delta v = -3 \text{ m/s left}$$

$$\Delta p = ?$$

$$\Delta p = m \Delta v$$

$$= (.02 \text{ kg})(-3 \text{ m/s})$$

$$\Delta p = -.06 \text{ kg m/s Left.}$$

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the contact time of  
the Fly Swatter + Stink Bug  
is .5 seconds.

WHAT IS the force I  
SUPPLIED?

$$\Delta p = -.06 \text{ kg m/s left}$$

$$\Delta t = .5 \text{ seconds}$$

$$F = ?$$

$$\Delta P = F \Delta t$$

$$\frac{- .06 \text{ kg m/s}}{.5 \text{ sec}} = \frac{F (\cancel{.5 \text{ sec}})}{\cancel{.5 \text{ sec}}}$$

$$- .12 \text{ N} = F$$



# CONSERVATION of momentum

INITIAL momentum before a  
COLLISION MUST EQUAL

THE FINAL momentum AFTER A  
COLLISION